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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.05/KNR/CSR-02/1078d/CEMENT/2015-16

Date: 23.02.2016

TEST REPORT ON CEMENT

*** CUSTOMER**	:	**Asst. Executive Engineer**, Byatarayanapura Sub Division, BBMP, Bangalore.
***AGENCY**	:	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
***NAME OF THE WORK**	:	Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.
***REFERENCE**	:	EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	22.02.2016
PERIOD OF TESTING	:	22.02.2016 to 23.02.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	28.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	150 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	475 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

AE-05 n/a

Note:

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⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

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VISHWANATH .C
Quality Manager

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E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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T-2377

Job No.: CTCE/BBMP/W.No.05/KNR/CSR-02/1078d/SAND-Gradation/2015-16 : 23.02.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. K. Narasimha Raju,**
# 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

*** Name of Work** : Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016

Technical Reference : IS : 2386 Part 1 - 1963 RA-2007

Sample ID : Fine Aggregates

Sample Received on : 22.02.2016

Date of Testing : 23.02.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	92.68	90-100	90-100	90-100	95-100
2.36	73.23	60-95	75-100	85-100	95-100
1.18	50.59	30-70	55-90	75-100	90-100
600 Micron	24.42	15-34	35-59	60-79	80-100
300 Micron	13.49	5-20	8-30	12-40	15-50
150 Micron	5.76	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/W.No.05/KNR/WMM/Gradation/2015-16

29.02.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. K. Narasimha Raju,**
175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

Name of Work : Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016.

Date of Testing : 29.02.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8690**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	325	325	3.7	96.3	95-100
22.4	2345	2670	30.7	69.3	60-80
11.2	1970	4640	53.4	46.6	40-60
4.75	1255	5895	67.8	32.2	25-40
2.36	915	6810	78.4	21.6	15-30
0.600	725	7535	86.7	13.3	8-22
0.075	815	8350	96.1	3.9	0-8

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Job No.: CTCE/BBMP/W.No.05/KNR/WMM/Gradation/2015-16

29.02.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. K. Narasimha Raju,**
175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

Name of Work : Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016

Date of Testing : 29.02.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8740**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	280	280	3.2	96.8	95-100
22.4	2230	2510	28.7	71.3	60-80
11.2	1875	4385	50.2	49.8	40-60
4.75	1365	5750	65.8	34.2	25-40
2.36	940	6690	76.5	23.5	15-30
0.600	815	7505	85.9	14.1	8-22
0.075	760	8265	94.6	5.4	0-8

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03.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. K. Narasimha Raju,**
175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

Name of Work : Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016

Date of Testing : 03.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8605**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	310	310	3.6	96.4	95-100
22.4	2340	2650	30.8	69.2	60-80
11.2	1875	4525	52.6	47.4	40-60
4.75	1360	5885	68.4	31.6	25-40
2.36	915	6800	79.0	21.0	15-30
0.600	745	7545	87.7	12.3	8-22
0.075	830	8375	97.3	2.7	0-8

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08.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. K. Narasimha Raju,**
175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

Name of Work : Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016

Date of Testing : 08.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8600**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	285	285	3.3	96.7	95-100
22.4	2160	2445	28.4	71.6	60-80
11.2	1845	4290	49.9	50.1	40-60
4.75	1465	5755	66.9	33.1	25-40
2.36	945	6700	77.9	22.1	15-30
0.600	715	7415	86.2	13.8	8-22
0.075	835	8250	95.9	4.1	0-8

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Job No.: CTCE/BBMP/W.No.05/KNR/WMM/Gradation/2015-16

14.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. K. Narasimha Raju,**
175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

Name of Work : Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016

Date of Testing : 14.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8810**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	345	345	3.9	96.1	95-100
22.4	2460	2805	31.8	68.2	60-80
11.2	1755	4560	51.8	48.2	40-60
4.75	1360	5920	67.2	32.8	25-40
2.36	950	6870	78.0	22.0	15-30
0.600	745	7615	86.4	13.6	8-22
0.075	825	8440	95.8	4.2	0-8

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Job No.: CTCE/BBMP/W.No.05/KNR/WMM/Gradation/2015-16

18.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. K. Narasimha Raju,**
175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

Name of Work : Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016

Date of Testing : 18.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8910**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	355	355	4.0	96.0	95-100
22.4	2650	3005	33.7	66.3	60-80
11.2	1345	4350	48.8	51.2	40-60
4.75	1470	5820	65.3	34.7	25-40
2.36	955	6775	76.0	24.0	15-30
0.600	825	7600	85.3	14.7	8-22
0.075	840	8440	94.7	5.3	0-8

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24.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. K. Narasimha Raju,**
175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

Name of Work : Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016

Date of Testing : 24.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8525**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	350	350	4.1	95.9	95-100
22.4	2160	2510	29.4	70.6	60-80
11.2	1475	3985	46.7	53.3	40-60
4.75	1350	5335	62.6	37.4	25-40
2.36	915	6250	73.3	26.7	15-30
0.600	875	7125	83.6	16.4	8-22
0.075	820	7945	93.2	6.8	0-8

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Job No.: CTCE/BBMP/W.No.05/KNR/WMM/AIV/2015-16

29.02.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of the Work	Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	29.02.2016

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	388	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines	22.08	22.68	
	100* (W_2/W_1)%			**22.38**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.05/KNR/WMM/S-T/2015-16 29.02.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of Work	Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	29.02.2016

Result : Flakiness Index = **11.65%**

Elongation Index = **13.28%**

Result : Combined Flakiness & Elongation index 24.93%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.05/KNR/SDBC/AIV/2015-16 28.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of the Work	Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	28.03.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	291	298	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	23.22	21.58	22.40

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.05/KNR/SDBC/Shape_T/2015-16 : 28.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	: **Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of Work	: Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 28.03.2016

Result : Flakiness Index = **11.39%**

Elongation Index = **13.75%**

Result : Combined Flakiness & Elongation index **25.14%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.05/KNR/SDBC/Stripping/2015-16 28.03.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of the work	Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	28.03.2016

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.30	96.70
2	3.3		
3	3.5		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.05/KNR/SDBC/Sp_Wa/2015-16 28.03.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of the Work	Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	28.03.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2018	2019	2020	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1263	1264	1265	
4	Weight of saturated surface dry aggregate in air	W_3 g	2016	2015	2014	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	753	751	749	
6	Weight of oven dried aggregate	W_4 g	1998	1999	2000	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.653	2.662	2.670	2.662
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.718	2.720	2.721	2.720
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.90%	0.80%	0.70%	0.80%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.05/KNR/SDBC/Bitumen/2015-16 29.03.2016

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX
AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
NAME OF THE WORK	Improvements to roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/217/2015-16 Dated: 16.02.2016
SAMPLE I/D	Roads and drains at surrounding areas (Muneshwaranagara & Anjanadri Layout) of Kogilu Layout in Ward No. 05
DATE OF TESTING	29.03.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474.4	474.8
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.6	25.20
7. Bitumen content in %	5.12	5.04
8. Average	**5.08**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	35.26	7.43	7.43	92.57	90-100
4.75	261.3	55.08	62.51	37.49	35-51
2.36	56.45	11.90	74.41	25.59	24-39
1.18	41.23	8.69	83.10	16.90	15-30
0.3	28.96	6.10	89.21	10.79	9-19
0.075	27.32	5.76	94.97	5.03	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	28.16	5.63	5.63	94.37	90-100
4.75	241.6	48.32	53.95	46.05	35-51
2.36	91.56	18.31	72.26	27.74	24-39
1.18	51.56	10.31	82.58	17.42	15-30
0.3	31.89	6.38	88.95	11.05	9-19
0.075	21.56	4.31	93.27	6.73	3-8

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